

SECTION 15090

SUPPORTS, HANGERS, ANCHORS, AND SLEEVES

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions apply to work of this section.

1.2 WORK INCLUDED

- A. Inserts and upper attachments.
- B. Pipe hangers and supports.
- C. Pipe anchors.
- D. Duct hangers and supports.
- E. Pipe and duct sleeves.
- F. Fabricated steel supports.

1.3 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this Section to the extent referenced. The publications are referenced to in the text by the basic designation only.
 - 1. American Institute of Steel Construction (AISC).
 - 2. American National Standards Institute (ANSI).
 - 3. American Society for Testing and Materials (ASTM).
 - 4. American Welding Society (AWS).
 - 5. The Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
 - 6. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA).

1.4 SUBMITTALS

- A. Comply with Section [22 05 00], Plumbing General Provisions.
- B. Submit product data for the following:
 - 1. Inserts and upper attachments
 - 2. Pipe hangers and supports

3. Anchors
4. Saddles and shields

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Fee and Mason Manufacturing Co.
- B. Grinnell.
- C. National Pipe Hanger Co.
- D. B-Line.

2.2 MATERIALS

- A. Design of pipe supporting elements shall be in accordance with ANSI B31.1.
- B. Steel hangers shall be fabricated in accordance with the requirements of MSS SP-58.
- C. The selection and application of pipe hangers and supports shall be in accordance with MSS SP-69.
- D. Steel angles, channels, and plate shall be in accordance with ASTM A36.
- E. Bolts, including nuts and washers, used for fabricating steel members shall be in accordance with ASTM A325.
- F. Welding of steel members shall be in accordance with AWS D1.1.
- G. Duct hangers and supports shall be in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, as applicable.
- H. Hangers and supports, including attachments, exposed to weather shall be hot dipped galvanized.

2.3 PIPE SUPPORT ELEMENTS

- A. The type numbers listed for pipe supporting elements are in accordance with MSS SP-58, except where a figure number is preceded by a manufacturer's name the manufacturer's figure number is listed.

1. Inserts

- a. For minimum 3 inch thick concrete use type 18 for poured in place and precast concrete.
- b. For poured in place and precast concrete less than 3 inch thick, and of sufficient strength to support attached load, use 4 inch square by 3/8 inch thick steel plate drilled for rod and recessed into top of slab. Attach rod to bottom of plate with fillet weld and to top of plate with bevel weld. Provide

spacers to position plate at proper height. Extend rod through form and attach nut to secure plate in permanent position.

- c. Where concrete slab will not support attached load span space between ribs with steel angle or channel attached to ribs with inserts.
- 2. Upper Attachments: Type 21, 22, 28, 29, or 30 beam clamps. Use Type 17 weldless eye nut for rod attachment to Type 21 and 22 upper attachments. Angle iron or channel clamps shall be Type 20 with a malleable iron heel plate added.
- 3. Hangers
 - a. Type 1 for all bare and insulated piping, unless indicated otherwise.
 - b. Type 41 or 43 where hanger rod deviates more than 4 degrees from the vertical, where pipe expansion exceed 1/2 inch, and where Type 39 insulated protection saddles are used on hot piping.
 - c. Hangers in contact with copper pipe shall be copper plated.
 - d. Parallel piping may be supported by trapeze hangers consisting of steel angle, channel, or beam suspended by steel rods attached to upper structure. Piping may be supported above, or suspended below, the angle channel, or beam.
- 4. Supports
 - a. Type 38 adjustable saddle for pipe supported from below where horizontal movement is negligible.
 - b. Type 31 welded steel bracket, as applicable, for piping run adjacent to, and parallel with, walls where support from above or below is not feasible.
 - c. Type 8 or 42 riser clamp for vertical risers. Provide Type 48 spring cushion where pipe expansion exceeds 1/2 inch and for plastic piping.
 - d. Fabricated steel supports for pipe anchors and guides shall be as detailed on the drawings. Where supports as detailed do not suite job conditions notify Architect prior to proceeding with fabrication.
 - e. Where supports are in contact with copper pipe, provide copper plated support, or wrap pipe with sheet lead.
- 5. Anchors
 - a. Fee and Mason Figure 140 for black steel pipe.
 - b. Fee and Mason Figure 141 for nonferrous pipe.
 - c. Where anchors are in contact with copper pipe provide copper plated anchor, or wrap pipe with sheet lead.

6. Saddles and Shields

- a. Type 39 insulation protection saddle for black steel hot piping.
- b. Type 40 insulation protection shield for piping size 2 inch and smaller, except black steel hot piping.
- c. Fee and Mason Figure 71 rigid insulation saddle for pipe size 2-1/2 inch and larger, except black steel hot piping.
- d. Rigid insulation saddle shall be a single bonded unit consisting of a galvanized metal shield, aluminum faced waterproof jacket, and a molded section of rigid polyurethane foam insulation. Rigid urethane foam shall have a density of 4 pounds per cubic foot, a thermal conductivity of 0.13 Btu-in/sq.ft./hr./deg. F at 75 deg. F mean temperature, and shall be suitable for 275 degree F continuous operating temperature.

2.4 SLEEVES

- A. Sleeves for pipes penetrating concrete and masonry walls, stud framed fire rated walls, and where extending above floor in wet areas, shall be schedule 40 steel pipe.
- B. Sleeves for pipe penetrating poured-in-place concrete floors and roofs may be steel pipe, or galvanized sheet metal of sufficient gauge to prevent collapse or distortion during construction.
- C. Sleeves for pipes penetrating exterior walls above and below grade, shall consist of a steel pipe sleeve with anchor and water stop plate, and a multiple link sealing element consisting of rubber sealing links, pressure plates, and connecting bolts and nuts. Sleeve assembly shall be suitable for 250 deg. F service.
- D. Sleeves for ducts penetrating concrete and masonry walls, stud framed fire rated walls, and poured-in-place concrete floors and roofs shall be 18 gauge sheet metal.

PART 3 - EXECUTION

3.1 PIPE SUPPORT ELEMENTS

- A. Inserts shall be placed and secured to concrete forms in correct locations.
- B. The maximum spacing between pipe supports for straight runs shall be in accordance with MSS SP-69. Pipe hangers or supports shall be spaced not over 5 feet apart at heavy fittings and valves. A hanger shall be installed at a distance not to exceed 1 foot from each change in direction of piping, including branch connections to mains.
- C. Supports for vertical piping shall be located at each floor or at intervals of not more than 15 feet and at intervals of not more than 8 feet from end of risers. Where supports are provided on intermediate floors spaced 15 feet or less between floors, no additional supports are required other than those specified for end of risers.
- D. Pipe supports for insulated pipe shall have a diameter of sufficient size to include the insulation. Hanger rod size shall be the manufacturer's standard size for the hanger to which it attaches.

- E. Hanger rods shall be subject to tensile loading only. Where lateral or axial movement is anticipated, use suitable linkage in hanger rod to permit swing.
- F. Provide hex head nut on rod at top and bottom of clevis hanger yoke, and at each rod connection to intermediate and upper attachment. Rod nuts shall be securely locked in place.
- G. The location of hangers and supports shall be coordinated with the structural work to ensure that the structural members will support the intended load.
- H. Hangers shall be fabricated to permit adequate adjustment after erection while still supporting the load. Turnbuckles shall be provided where required for vertical adjustment of the piping.
- I. Fabrication and installation of pipe hangers and supports shall be in accordance with MSS SP-89.

3.2 FABRICATED STEEL SUPPORTS

- A. Steel supports for ducts, pipe anchors, and piping supported from below shall be fabricated in accordance with AISC Specification for the Design, Fabrication and Erection of Structural Steel for buildings.
- B. Steel for supports shall be saw cut, with sharp edges ground smooth. After fabrication remove all foreign material, including welding slag and spatter, and leave ready for painting or galvanizing, as applicable.

3.3 SLEEVES

- A. Secure sleeves to forms for concrete construction. Ensure sleeves are not disengaged or misaligned by concrete placement operations.
- B. Provide temporary cap for open end of sleeves to prevent entrance of concrete.
- C. Provide temporary internal bracing where required to prevent distortion of sheet metal sleeves by concrete placement operations.
- D. Sleeves shall not be installed in structural members, except where indicated or approved.
- E. Furnish sleeves to masonry contractor in advance of masonry work. Furnish dimensioned drawings indicating exact location of sleeves.
- F. Each sleeve shall extend through its respective wall, floor, or roof, and shall be cut flush with each surface, except as indicated otherwise.
- G. Sleeves passing through floors in wet areas, such as areas containing plumbing fixtures or floor drains, shall extend a minimum of 4 inches above the finished floor. Duct sleeves in wet areas shall be enclosed with 4 inch concrete curb.
- H. Unless otherwise indicated, sleeves shall be of a size to provide a minimum of 1/4 inch clearance all around between the pipe or duct and inside of sleeve, or between jacket over insulation and sleeve.

- I. Provide membrane clamping device on sleeves for waterproof floors.

END OF SUPPORTS, HANGERS, ANCHORS, AND SLEEVES